

UNDERSTANDING AADHAAR

INDIA'S NATIONAL IDENTIFICATION
INITIATIVE

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Indian Century
ROUNDTABLE

Understanding Aadhaar, India's National Identification Initiative

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Executive Summary

Aadhaar ('Foundation') is India's national identification system and the world's largest national biometric ID card initiative, with [nearly 1.377 billion](#) unique ID numbers issued.

India has a large population that measures poorly on social parameters such as nutrition and mortality. While governments attempted to address these with social welfare, the schemes were poorly managed for decades. India's Public Distribution System (PDS), possibly the world's largest essential commodities distribution system, was known to be inefficient and corrupt. India also had the problem of unauthorised movement across the international border, compromising the country's security. A national ID can address problems as diverse as these.

In 2009 the government formed the Unique Identification Authority of India ([UIDAI](#)), a body mandated with implementation of India's national ID initiative, the Aadhaar system. The Aadhaar ID consists of the holder's name, date of birth, gender, address and multimodal [biometric data](#) (ten fingerprints, iris scan, and photograph). Aadhaar IDs are issued based on validation of specified identity documents provided by each applicant. Although not mandatory, almost every adult Indian resident today is an Aadhaar ID holder.

Based on a 2018 supreme court ruling, Aadhaar has been made mandatory for beneficiaries of government welfare schemes. Its introduction has transformed PDS into a much more efficient, transparent and reliable welfare system. Besides PDS, Aadhaar has helped uplift existing social welfare schemes and successfully implement new ones related to:

- Supporting India's farmers
- Rural employment guarantees
- Health insurance

One of India's significant social achievements in recent times has been financial inclusion. In 2011, 35% Indians had bank accounts. By 2021, 78% did. As a standard national ID, Aadhaar was an important enabler for this uplift. Bank accounts of beneficiaries of welfare have been linked with their Aadhaar IDs, making transfer of any financial support by the government transparent and inexpensive. Aadhaar was also used by the government during the Covid pandemic to facilitate the provision of essential commodities and to track the population's vaccination coverage.

Key take-aways:

- Introduction of the Aadhaar national ID has transformed India's previously corrupt and inefficient welfare schemes for the better
- The Aadhaar national ID has improved India's security posture
- The Aadhaar national ID has facilitated compliance with know your customer (KYC) regulatory requirements by banks and other service providers
- The Aadhaar national ID has enabled unprecedented financial inclusion of India's underprivileged population

Introduction

India's Aadhaar ('Foundation') system is the world's largest national biometric ID card initiative, with [nearly 1.377 billion](#) unique ID numbers issued as of August 2023. More than [97 billion Aadhaar authentications](#) have been performed, approximately three-quarters of them via biometric data. Among biometric authentications, currently 98% use fingerprints and 2% use retina scans) Daily average authentications [now top 65 million](#) on a typical weekday. More than 80% of current Aadhaar ID authentications are now biometric, with [nearly all banking authentications](#) coming in via biometric channels. An average of [approximately 10 million](#) know your customer verifications are made using Aadhaar every single working day.

Over the last few decades, several countries have implemented national identity card initiatives, issuing standardized unique IDs to their respective citizens. While strengthening national security remains one of their fundamental benefits, national IDs have other noteworthy applications for countries and their governments. They help run welfare schemes efficiently and transparently, benefiting the targeted populations and allowing governments to optimize costs. They enable financial inclusion of a country's unbanked population, and can be a powerful tool with governments during health crises.

India grapples with significant social inequalities. For decades, governments have run various welfare schemes to address some of the challenges stemming from these disparities. But these schemes have a long history of inefficiency and corruption, that costs governments considerable amounts of money and the intended beneficiaries their welfare. Implementation of a national ID system would help address this challenge.

National ID systems also play a role in internal and border security. India, the seventh largest country by land area, has an international border stretching over 15,000 kilometres, which it shares with seven neighbouring countries. Some stretches of this length are susceptible to unauthorized cross border movements, potentially compromising India's security posture. A national ID system helps countries detect and monitor irregular immigration. However, notwithstanding these compelling cases for national IDs, it wasn't until 2001 that a [multipurpose](#) national identity card was recommended to, and accepted by, the Indian government.

Implementing a national unique ID initiative

Introducing national IDs can be one of the most challenging technological endeavors to implement in a country. The government must have (i) good understanding of the typical outcomes associated with such initiatives, (ii) a clear vision on the specific issues that national IDs will address in their country, and (iii) the ability to identify and evaluate the benefits after implementation. Such initiatives also need detailed planning and ongoing governance during their implementation lifecycle. A robust and long-term technology solution and supporting infrastructure need to be designed and built. In order to effectively execute the initiative, a large number of individuals must undergo training in processes and technologies. Significantly, such initiatives make the government custodian of their country's largest database of sensitive personal data. In addition, widespread use of national IDs makes personal data accessible to both government and private agencies. So, while designing the solution, it is also imperative to incorporate measures for ensuring ongoing protection of this information.

In practical terms, governments often lack the comprehensive expertise and the workforce necessary to effectively execute an initiative of such scale and complexity, and must rely on external professional talent to lead and manage its implementation. The Indian government set up a professional body, Unique Identification Authority of India ([UIDAI](#)) in 2009, entrusting it with planning and implementing the initiative. Nandan Nilekani, the well-regarded co-

founder of Indian information technology giant, Infosys, was appointed as its chairman. Nilekani was also accorded the rank of a cabinet minister, enabling him to attend the government's cabinet meetings, thus establishing a strong support interface between UIDAI and key ministries.

Conventionally, national IDs have been developed based on data such as name, date of birth, gender and address. This limited set of variables pose challenges for unique ID implementations, such as being susceptible to identity fraud and being an inefficient solution. India has its own set of complex social variables – over a billion people, many having same or similar names, common dates of birth, varying naming conventions by state or region, and movement of populations within and across states – notwithstanding which the solution had to allow for unique identification and authentication of each individual reliably and efficiently. UIDAI ensured this by designing a unique ID that included multimodal [biometric data](#) (ten fingerprints, iris scan, photograph) in addition to the conventional dataset.

How India's Judiciary shaped the National ID initiative

The decision to implement a national ID for every Indian was made in 2001 by the National Democratic Alliance (NDA) government led by the Bhartiya Janata Party (BJP), and the initiative kicked off in 2009 when UIDAI was constituted by the United Progressive Alliance (UPA) government led by the Indian National Congress (INC), which named it Aadhaar (meaning 'Foundation', in Hindi). Making a start with its first Aadhaar card in 2010, UIDAI [committed](#) to issuing 600 million over four years, and was able to [achieve](#) that goal by 2014. The NDA returned to power in that year and pursued Aadhaar implementation even more aggressively than its predecessor. Both governments understood well the potential benefits of every Indian holding a unique ID and, during initial years of Aadhaar implementation, tacitly attempted making Aadhaar [mandatory](#) by taking steps such as asking government and private agencies to demand it as proof of identity.

However, both governments were challenged over such attempts. While IDs such as driving licenses, passports and ration cards have been used as proof of identity for decades, no single one of these is or will ever be held by every Indian citizen. Aadhaar is a one-of-a-kind sweeping initiative for India's vast population, involving collection and retention of personal data by the government on an unprecedented scale. Additionally, it allows private entities such as banks or telecom services providers to seek and retain this data. In the early years there were apprehensions about compromise of identity information or its use for citizens' surveillance. Different aspects of the national ID initiative were legally challenged. One [petition](#) by a former judge even struck at its root, arguing that implementation of a unique ID for citizens violated fundamental rights to equality, life and liberty.

In 2018 the Supreme Court of India delivered its collective [verdict](#) for all the petitions. It upheld the legitimacy of a unique ID for residents of India and recognized Aadhaar's potential to empower "disenfranchised sections of society by providing them better access to fundamental entitlements, such as state subsidies." Further, it ruled Aadhaar as mandatory for citizens availing government welfare. This verdict settled questions on Aadhaar's legality, allowing the government to focus on completing the ambitious initiative it was heavily invested in, and which had already started yielding benefits for citizens and the government.

Significantly, the Supreme Court verdict meant that Aadhaar could *not* be made a mandatory ID for all citizens. According to the [scope](#) defined by UIDAI, all residents of India (not just its citizens) are eligible to apply for it. Interestingly, in spite of Aadhaar not being mandatory, by September 2022 nearly [100%](#) of India's adult citizens, over [92%](#) children between 5 and 18 years and 25% under 5 years had been allotted their Aadhaar IDs.

Aadhaar enrolment process and the choice of ID card

The basis of a successful national ID initiative is its ability to reliably distinguish legitimate applicants from illegitimate ones. Based on the differentiation, applications of legitimate residents can be processed and IDs assigned, while cases of unauthorized residents can be managed suitably by the government.

The Aadhaar [enrolment](#) process involves validating applicants' existing identity documents and proof of address for authenticity. For applicants not having all of these, alternatives – introduction by the Aadhaar-holding head of family or a government-appointed introducer – have been provided. On successful validation of documentation, applicants are issued Aadhaar cards.

While this seems a reliable process to differentiate legitimate residents from among all applicants, it is important to recognize that since the early years of India's independence, a large number of unauthorized immigrants have flowed in through porous international borders, and that many of them would have illegally secured Indian identity documents. It may be possible to detect recent cases of [Aadhaar](#) and [other](#) identity fraud, but would be very difficult for enrollment authorities to detect identity documents acquired fraudulently several decades earlier. It is equally important to acknowledge that despite the possibility of many illegal immigrants having blended with the masses, every adult applicant's identity documentation has been inspected and IDs issued only after they met the defined criteria.

In terms of type of ID cards to be issued, UIDAU had the option of choosing conventional cards or smart cards. While conventional cards would have all relevant identity details printed on them, smart cards have an embedded microchip that stores the holder's identity details. The latter are more secure than conventional ones and besides identity details can store information that can enable other services, such as online transactions. However, conventional cards were chosen since the core purpose of this initiative was to validate card holders' identity. The smart card option would also have cost substantially more in terms of manufacturing the cards and setting up supporting infrastructure across the country.

Leveraging Aadhaar in India's welfare schemes

In 1950, a few years after India gained independence, the population's life expectancy was [35 years](#) against the global average of [46 years](#). In Europe, North America and Japan, it was far higher at [60+ years](#). Child (under 5 years old) mortality was about [26%](#), against [5%](#) in North America and Europe. Such poor health parameters made a compelling case for the government's direct and urgent investment in nutrition for the country's vast underprivileged population. But this national need required a commodities distribution system that included procurement, storage, transportation and distribution of foodgrains. Fortunately, since before independence, India had a [Public Distribution System](#) (PDS), which the government was able to leverage.

Public Distribution System

Over the decades, independent India's population growth rate exceeded the rate at which sustainable employment opportunities were being generated. Consequently, this grew the sections of the population needing government support for food security, compelling governments to keep expanding the PDS. Over time PDS has grown to such an

extent that today it may be the [largest](#) essential commodities distribution system in the world.

Welfare schemes are complex initiatives to plan, implement, sustain and grow. They require definition of beneficiary categories based on study of the whole population's demographic data. For each category, there should be an up-to-date database of beneficiaries, including the attributes needed by welfare schemes. Based on the nature of commodities or services to be provided to beneficiaries, end-to-end supply chains need to be established and run. Much like national ID initiatives, welfare schemes need to be run professionally to avoid corruption, waste and inefficiency. But successive Indian governments did not have the resources to set up a professional body to run and grow the PDS. They continued to do so themselves, even as problems such as inefficiency, wastage and corruption took root decades ago and simply grew with the PDS.

Over the decades multiple attempts were made to address the PDS's inherent problems, and to further expand the system. Among the more recent ones were Revamped Public Distribution System ([RPDS](#)) and Targeted Public Distribution System ([TPDS](#)). RPDS, launched in 1992, attempted to streamline distribution and extend the beneficiaries' base to hilly, remote and inaccessible parts of India. TPDS, launched five years later, strove to expand the list of beneficiaries below the poverty line based on their "foolproof" identification, and to make distribution efficient.

These ambitious attempts to overhaul the PDS failed to cure it of its deep-rooted problems. According to a 2008 report, [36.7%](#) of foodgrains intended for poor households was sold in the open market, and [58%](#) of subsidized foodgrains did not reach intended recipients due to errors in delivery and identification. Yet even as it continued to collapse under the weight of its inherent failings, the government kept growing the list of beneficiaries. TPDS grew the beneficiaries' base to over 65 million families. In 2000 the government further expanded it by 10 million "poorest of the poor" families. Between 2003 and 2005 another 5 million families were identified for benefits' provision.

In 2013, possibly with an eye on the upcoming general election, the Indian government notified the National Food Security Act ([NFSA](#)), which committed to ensuring "access to adequate quantity of quality food" for targeted beneficiaries. The act also broadened existing beneficiary categories and [introduced](#) new ones focused on women and children. Collectively, this extended the coverage of PDS to 75% of India's rural and 50% of the urban population (over 850 million people). The ray of hope in this ambitious act was that the government proposed direct benefits transfer ([DBT](#)) – direct cash transfer to bank accounts of beneficiaries – to help meet NFSA's objective. This was a revolutionary proposal which would have ensured availability of some component of benefits to targeted families, without delay, loss or theft – something the PDS had not been able to achieve for decades.

However, the success of DBT was dependent on (i) each beneficiary household having access to banking, and (ii) the government's ability to transfer money to the right accounts. The daunting challenge DBT implementation faced was that till 2014 only [53%](#) Indians were banked. India's under-privileged – those most in need of welfare – were largely unbanked.

In 2014, months after assuming power, the new NDA government took the necessary step to address this gap. It launched the [financial inclusion](#) scheme, Pradhan Mantri Jan Dhan Yojana ([PMJDY](#)), under which [125 million](#) bank accounts for unbanked households were opened by early 2015, just over five months into the scheme. The next step for the government to take was to identify DBT beneficiaries among account holders and link bank accounts with Aadhaar numbers. Through March 2021 [730 million](#) bank accounts had been linked with account holders' Aadhaar

numbers. Aadhaar has become the 'financial address' of beneficiaries, making welfare options like DBT a reality.

Eight years into PMJDY, over [460 million](#) accounts had been opened. An increasing percentage of banked beneficiaries of welfare has reduced some decades-old problems of the PDS. Making Aadhaar the backbone of the welfare system has also resulted in identification and [elimination](#) of millions of non-existent or duplicate beneficiaries, helping the government optimize spending. As the de facto proof of identity for banks' know your customer (KYC) requirements, Aadhaar has also provided the foundation for the impressive increase in making banking services accessible for the unbanked.

For welfare means other than DBT, the government needs an accurate list of all beneficiaries by category, by state, district and village, town or city at all times. Such an objective would be unachievable without a well-maintained database of recipients, containing relevant parameters such as qualifying criteria, bank account numbers and address. This too has become much easier to achieve with Aadhaar implementation. Aadhaar has made India's PDS today a bigger success than it ever has been.

Aadhaar as the backbone for other critical welfare schemes

Of their total expenditure on healthcare, Indians spend [62%](#) from their pockets – an expense most families are ill-prepared to incur. To protect less privileged Indians from bigger health-related expenses, the government commenced [Ayushman Bharat](#) initiative in 2018. A key component of this initiative is health insurance for over 550 million vulnerable Indians (nearly 40% of India's population) for INR 500,000 per family each year. Here too [Aadhaar IDs](#) of beneficiaries are leveraged to implement this scheme effectively.

The Indian government's flagship rural employment scheme, Mahatma Gandhi Rural Employment Guarantee Scheme ([MNREGS](#)) launched in 2005, committed to providing at least 100 days of employment annually to families having only unskilled adult members. Running MNREGS without the digital backbone Aadhaar opens it to not meeting objectives of employment guarantee, besides having inefficiency and corruption embedded within – similar to PDS's story for over half a century. As of November 2022, MNREGS had issued [169 million](#) job cards to entitled individuals, all of which were expected to be [linked](#) with Aadhaar IDs by December 2022. The linking facilitates tracking of work allocation, completion of work and payment to workers. By December 2022, over [113 million](#) households had benefited from employment provided by MNREGS. Aadhaar has also been leveraged for smaller employment-enabling [schemes](#).

India's agriculture sector makes a contribution of [over 20%](#) to the country's Gross Value Added (GVA). Agriculture also employs more than [40%](#) of India's population directly or indirectly. Although farmers play a vital role in this sector, a large number commit [suicide](#) every year, [primarily](#) because of crop failure. To reduce both chances and impact of crop failure, the government has started offering farmers several [schemes](#), ranging from advisory on soil health, optimal irrigation and use of fertilizers, to comprehensive [crop insurance](#). Here too farmers' Aadhaar IDs are being leveraged to deliver these services more effectively and transparently.

Only [35%](#) Indians had bank accounts in 2011. Ten years later the percentage had increased to 78% (the world average then was 69%), thanks largely to the government's financial inclusion scheme, PM Jan Dhan Yojana ([PMJDY](#)). Such an impressive increase in the percentage of banked Indians not just gives the underprivileged the option to saving their money securely, but also reduces cash transactions which feed the illegal money economy. The period of this increase in banked Indians coincided with successful implementation of Aadhaar across the

country. Aadhaar, used to validate the [identity](#) (know your customer – KYC) for new bank customers, has enabled large scale financial inclusion in India.

Where Aadhaar is used as proof of identity, KYC can also be performed [electronically](#), saving customers and service providers time and effort, and improving customer experience. It can also be used for KYC for other utilities such as applying for phone and cooking gas connections.

Lastly, as the Covid pandemic enveloped the world in 2020, every country's government took steps to protect their people. Among other steps, Government of India arranged availability of vaccinations for India's entire population, and provided foodgrains to sections of the population that had no sources of income during lockdowns. Here too Aadhaar served as the digital backbone for tracking the population's [vaccination](#) coverage and making [foodgrains](#) available.

Appropriate use and protection of Aadhaar data

An Aadhaar [record](#) consists of personally identifiable information (PII) such as name, date of birth, biometric data, mobile number and the randomly generated unique Aadhaar number. The Aadhaar card itself displays the cardholder's picture, date of birth, address and unique number. UIDAI has collected and stored personal details of over a billion people, and issued Aadhaar IDs to them. The Aadhaar initiative has made UIDAI custodian of the world's biggest, and growing, database of PII, and the largest number of people in any country, the holders of national identity cards. The Aadhaar ID is commonly sought by government and private agencies to validate a person's identity. It is extremely important to understand how well-protected are the Aadhaar database with UIDAI, details of the ID with numerous agencies and service providers, and indeed, the IDs with cardholders themselves.

Protecting Aadhaar data

Ensuring "security and confidentiality of identity information and authentication records" is one of UIDAI's mission [statements](#). To achieve this, UIDAI [defined](#) an approach that involved (i) collection of identity-related information by trained and certified [staff](#), (ii) protection of stored information and (iii) restrictions on access to it. There is also a legal framework around protection of Aadhaar data, making its misuse a criminal offence that invites [stringent](#) punishment. According to UIDAI the Aadhaar database has never been [breached](#).

However, beyond protection of data collected and stored by UIDAI, Aadhaar IDs are also sought by agencies and service providers to verify individuals' identities. Typically, cardholders provide printed or scanned copies of Aadhaar IDs. However, if the receiving agencies do not fully understand the sensitivity of Aadhaar data, these copies may not be handled appropriately in their custody. To discourage circulation of copies of Aadhaar cards, UIDAI has introduced [masked](#) Aadhaar, which displays only the last four digits of an Aadhaar number. It can be downloaded by Aadhaar holders via the Aadhaar mobile application or from UIDAI's site and shared with agencies. Secondly, appropriate protection of Aadhaar data even in digital form is important. There have been instances of government agencies not [handling](#) Aadhaar-related information as they are [obliged](#) to.

UIDAI has mandated strong security measures for agencies performing Aadhaar [authentication](#) for individuals. The agencies must meet [data protection](#) criteria defined as per Aadhaar Act. It is also mandatory for them to set up and

maintain an Aadhaar data [vault](#), a centralized dedicated storage intended to rationalize the size of the Aadhaar footprint in the IT ecosystem. Once appointed, agencies need to undergo compliance [audits](#). The authentication, which requires requests to be sent to and responses received from, UIDAI's Central Identities Data Repository ([CIDR](#)), is performed using secure protocols. Secure means for authentication – [Electronic KYC](#) (eKYC) and [secure QR code](#) – have also been introduced.

Besides security measures and processes, a critical aspect of identity data protection is raising awareness levels among individuals, agencies and service providers about its sensitivity. To this end, UIDAI uses [social media](#) and other [broadcasting avenues](#).

Benefits and threats

Since early days of its launch, a small but influential section of India's society has accused the government of intending to use Aadhaar for citizens' surveillance. Theoretically, widespread use of Aadhaar gives governments the ability to do so. But the possibility of surveillance of a small number of individuals needs to be assessed against the transformations Aadhaar has helped realise. It has dramatically reduced deep-rooted corruption in welfare schemes, also improving efficiency and reducing waste like never before. It has enabled better targeting and expansion of welfare. It has enabled financial inclusion of a large section of the population. It has also strengthened India's security posture.

Surveillance should be ordered by the government only on specific grounds, such as to investigate threats or perceived threats to national security. If any individual believes they are being wrongly subjected to surveillance, they have the means to challenge the government democratically. The variety of benefits delivered to huge sections of the population far outweighs the *fear* of surveillance of some. Secondly, peoples' existing and growing digital footprint is a far more potent tool for surveillance than their Aadhaar IDs. If millions of Indians are active online by choice, in spite of the possibility of their activities and views being tracked by the government, the case for opposing Aadhaar for preventing surveillance becomes weaker still.

Unique ID initiatives in other countries

Every country has government-issued documents such as driver's licenses or passports that can be used as proof of the holder's identity in that country. However, not many countries have standardized national IDs and just a few have mandated ones.

The United States, for example, does not have a standard national ID. A driver's license or Social Security Number (SSN) are commonly used as proof of identity. There are some striking similarities between Aadhaar and SSN. While neither is mandatory, both are de facto IDs in their respective countries, both are permanent once allotted, and both are used as means to deliver welfare to beneficiaries. Both contribute to strengthening national security. Among their differences are that SSN is typically required for someone to legally work in USA. It has evolved into the de facto national ID for taxation, required during some certain financial transaction types. For similar types of transactions, Indians need a Permanent Account Number. Biometric data is not collected for issuing SSNs.

The French Carte Nationale d'Identité (CNI) is the recognized identity document issued by the French government to

citizens, although it too is not mandatory. Uses of CNI are similar to those of the Indian and American national IDs, such as for opening a bank account or claiming social welfare. A significant difference though is that the CNI is issued as a smart card that holds an individual's biometric and other personal data.

The Israeli Teudat Zehut is the official national ID, mandatory for citizens aged 16 years and above. As in other countries' national IDs, it is required for availing of welfare and performing certain financial transactions. It is also used for voting in elections and as a means to strengthen national security. The Teudat Zehut does not collect biometric data.

The Bangladeshi national ID is mandatory for citizens 18 years or older. An individual's biometrics data is collected to issue the smart card. It can be used to access a variety of government services, voting in elections and conducting certain financial transactions.

Whether wealthy or developing, countries have varying business cases for introducing standardized national IDs. However, the core purposes remain common – providing welfare efficiently and transparently and strengthening national security. For countries with low per capita GDP and large populations, there may be compelling cases to build efficient and transparent essential commodities distribution systems. For democracies, the national ID can be used during voting (India has a separate voter ID). For any country, they can enable oversight of certain types of financial transaction to detect possible illegal activities such as money laundering. There are many use cases for every country but a single, robust solution is the national biometric ID.

The road ahead

While several countries across the world have implemented mandatory or voluntary national IDs, perhaps nowhere has it proved to be as powerful a tool for bringing about multidimensional transformation, as it has in India.

Aadhaar has reduced the threat to national security. PDS, which bled the taxpayer for decades, has never been as efficient and transparent, as it is now. More money than ever before from government welfare reaches intended beneficiaries, and more beneficiaries than ever before are receiving welfare today. India's farmers are receiving variety of support, which should result in a decline in tragic suicides that have plagued the agriculture sector for decades. With a reliable database of demographic data, the government is also better placed to identify new categories for benefits provision, should the need arise. Aadhaar's full potential is yet to be realized.

Although a national ID initiative was long overdue, Indian governments in power over more than two decades have done well to invest in and utilize Aadhaar. From the vision of a multipurpose ID and its successful implementation, to leveraging it on an unprecedented scale, India's national ID journey has been unique. The lessons learnt place India well to guide other countries in undertaking their own national ID initiatives, enabling them to harness the numerous benefits they offer.

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